

R E M A R K S

Further reconsideration of the above-identified patent application is respectfully requested in view of the following remarks. Claims 1 through 20 remain in the application.

The invention comprises a method for removing a small layer of copper from copper features forming part of a printed circuit board by using etchants, many of which have been used before but not without removing large quantities of copper. The copper is selectively removed in the present invention by applying an inorganic acid etchant, persulfate and phosphate salts. THE APPLICATION SPECIFICALLY ESCHEWS THE USE OF NITRIC ACID, BECAUSE IT REMOVES COPPER IN BULK. The basis for this statement is to be found in Applicants' specification starting on page 4, line 9: "...although numerous chemical copper-etchant compositions are known in the art of microelectronic package manufacture, they cannot be indiscriminantly used in this application since they, by definition, will erode the bulk of the copper. Such etchants include copper or ferric chlorides, chromium salts, alkaline-ammonia, hydrogen peroxide-sulfuric acid or nitric acid compositions."

The specification further states on page 5, line 9, that:  
"Nitric acid, either alone or in combination with sulfuric acid, or copper nitrate, has been reported by Brittey (United States Patent No. 4,695,348) to be useful for etching copper in wiring boards. However, nitrogous oxide gas is a byproduct of this process."

This is the major issue in the prosecution of this application. Also, Applicants wish to add that the Japanese reference does not appear to be concerned with "microetching," a process that uses very fine line circuitry. The Japanese reference, application no. JP 5-148,658, specifically states the problem with copper processing after electroless-plating: it is desirable to use a solution containing a kind of a sulfuric acid, a hydrochloric acid, a nitric acid, and the phosphoric acids, or two or more acids.

The Japanese reference is old art and is not concerned with microetching in the sense presented by Applicants' invention. Applicants are using much finer copper wire thicknesses. Bulk copper removal is not the problem for this Japanese reference. The Japanese reference has a whisker

forming problem, not a bulk copper removal problem. The Japanese reference is being read into Applicant's invention, and it appears that where it coincides with similar chemistry, it fails by being an opposite teaching (i.e., the problem of growth of the copper (whiskers) versus Applicants' problem of bulk copper removal).

As aforementioned, Applicants believe that they cannot add a negative limitation to the claims, it being against the rules. Thus, Applicants' attorney respectfully disagrees that the invention can use a negative limitation as suggested by the Office. Furthermore, a Markush recitation of feasible etchant compounds that do not contain nitric acid, as suggested by the Office, may not be supportable by the specification. Also it would severely limit the breadth of Applicants' claim. With all due respect, the Office has no right to suggest limiting the breadth of a claim where Applicants desire the full measure of their inventive grant.

It is still this attorney's position that claims of any application must be interpreted with respect to the meaning of the specification. Therefore, Applicants deserve to have the

present claims considered as containing this limitation.

Applicants also believe that, without solving the same problem, the Japanese reference cannot be applied in the statutory sense of 35 U.S.C. §103.

In view of the foregoing remarks, Applicants respectfully once again request that claims 1 through 20 be allowed and that the application be passed to issue.

Respectfully submitted,

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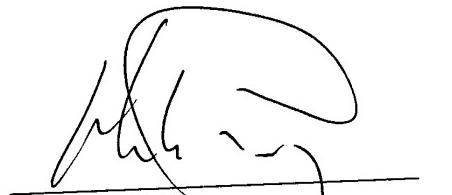
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Mark Levy, Reg. No. 29,188

Attorney



Mark Levy  
Registration No. 29,188  
Attorney for Applicants  
SALZMAN & LEVY  
Press Building - Suite 902  
19 Chenango Street  
Binghamton, New York 13901

Phone: (607) 722-6600